1090-WP24-03
13 January 2009

RTCA Special Committee 186, Working Group 3

ADS-B 1090ES MOPS Maintenance

Meeting #24

Honeywell Aerospace, Phoenix AZ
13 – 15 January 2009

Address the DO-260A Change 2 SIL / NIC / NAC_P / NAC_V Dependency on Vertical Integrity & Accuracy

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13 January 2009

Address the DO-260A Change 2 SIL / NIC / NAC_P / NAC_V Dependency on Vertical Integrity & Accuracy

In Change 2 of DO-260A a modification has been made to Tables 2-72 and A-17; SIL Subfield Encoding. This change inserted a dependence on VPL (Vertical Protection Limit) for Surveillance Integrity Level (SIL) encoding (for NIC values >8) when previously SIL was defined in DO-260A only as a function of the horizontal position integrity limits. If a VPL cannot be provided for those NIC values (9, 10, & 11) then "The SIL encoding is the most stringent of the horizontal or vertical values" which means that the SIL subfield must be set to a value of 0. The same dependency on VPL has been added to the SIL parameter definitions in Table 2-5 in DO-242A, Change 1, Table 3-8 in DO-289, Change 1 and Table 2-5 in DO-302. The original coding of SIL as defined in DO-242A Rev New was defined in Section 2.1.2.15 and Table 2-5 and was defined only as a function of horizontal integrity limits.

A similar dependency on VPL exists in DO-260A, Table 2-70; NIC Encoding. If a VPL cannot be provided then the highest NIC that can be declared is 8 under all conditions, even if the horizontal position sensor is reporting an HPL equivalent to a NIC=9 or a larger value. The same dependency on VPL has been added to the NIC definitions in Table 3-5 in DO-289, Change 1 and Table 2-2 in DO-242A, Change 1. The dependence on VPL for higher NIC values originally documented in the ADS-B MASPS; DO-242A; Section 2.1.2.12 and Table 2-2 (Note 5) was for the case only when geometric altitude was being reported.

A dependency on vertical accuracy (VEPU) exists in the NAC_P encoding table, Table 2-71 of DO-260A, Table 2-3 in DO-242A and Table 2-6 in DO-289. A dependency on vertical figure of merit (VFOM) exists in the NAC_V encoding tables, Table 2-25, 2-26 and 2-27.

Boeing objects to these changes in definition, and to the general concept of dependence on vertical accuracy and integrity for these horizontal quality parameters. These limitations will unfairly penalize operators who will be attempting to equip with ADS-B OUT equipment early and gain near term benefits in non-radar airspace (NRA) where the key ADS-B performance requirements are in the horizontal plane only. The NRA Safety, Performance and Interoperability Requirements document; DO-303, does not contain any dependence on vertical accuracy or integrity in the requirements for the transmitted horizontal quality parameters. A transmitted SIL value of zero (0) would severely limit the usefulness of an aircraft's ADS-B OUT data set as most applications for ADS-B OUT and ADS-B IN will require a minimum SIL value of one (1) or greater.

Thousands of aircraft worldwide are certified under both FAA (FAA Guidance Document 91-RVSM) and ICAO rules to operate in RVSM airspace at 1000' adjacent flight level spacing without a VPL output from the altimetry system. Since the FAA ADS-B program does not plan to make changes to these flight level separation standards, it seems unreasonable to require more stringent vertical data integrity standards for ADS-B OUT operations than those already in effect for enroute airspace.

Similarly, the dependency of NIC on VPL is an artificial limitation on an aircraft's ADS-B indicated performance. Under the current requirements, this dependency would limit the maximum transmitted NIC value to 8 when the aircraft's true horizontal integrity performance might be a value of 9 or greater.

The dependency of NAC_P on vertical accuracy (VEPU) is also an unnecessary limitation on an aircraft's ADS-B indicated performance. This would limit the maximum transmitted NAC_P value to 8 when the aircraft's true horizontal accuracy performance might be a value of 9 or greater.

The FAA and industry are evaluating multiple solutions to mitigate Runway Incursion issues, including the use of ADS-B OUT data and surface ADS-B IN applications on a CDTI. These surface applications will require increased horizontal accuracy and integrity data. The performance and availability of targets for these applications will be limited by the dependence on vertical accuracy and integrity in the transmitted NIC, SIL, NAC_P and NAC_V parameters, even though the vertical data is irrelevant for their operation.

ADS-B applications, whether ground based in the ATC infrastructure and/or airborne ADS-B IN, that will require airborne vertical accuracy and integrity data have a long term schedule in the ADS-B development roadmap. When those ADS-B IN applications that require vertical accuracy and/integrity data are approved and ready to be deployed NAS wide, the required vertical accuracy and integrity quality parameters could be broadcast in new data fields separate from the corresponding horizontal parameters. Until then, they are premature and an unnecessary limitation on the near term applications and should be withdrawn.

Summary of recommended changes for DO-260A Change 3, DO-242A Change 2 and DO-289 Change 2:

1. Remove any dependence on VPL from the definition of SIL (Table 2-72) in DO-260A, Change 3.
2. Remove any dependence on VPL from the definition of SIL (Table 2-5) in DO-242A, Change 2.
3. Remove any dependence on VPL from the definition of SIL (Table 3-8) in DO-289, Change 2.
4. Remove any dependence on VPL from the definition of NIC (Table 2-70) in DO-260A, Change 3.
5. Remove any dependence on VPL from the definition of NIC (Table 3-5) in DO-289, Change 2.
6. Remove any dependence on VPL from the definition of NIC (Table 2-2) in DO-242A, Change 2.
7. Remove any dependence on vertical accuracy (VEPU) from the definition of NAC_P (Table 2-71) in DO-260A, Change 3.
8. Remove any dependence on vertical accuracy (VEPU) from the definition of NAC_P (Table 2-3) in DO-242A, Change 2.
9. Remove any dependence on vertical accuracy (VEPU) from the definition of NAC_P (Table 2-6) in DO-289, Change 2.
10. Remove any dependence on vertical figure of merit (VFOM) from the definition of NAC_V (Tables 2-25, 2-26 and 2-27) in DO-260A, Change 3.